

REMARKS

(A) STATUS OF THE CLAIMS

Claims 1, 3, 4, and 6-8 are pending in the application.

Claims 2, 5, and 9 were previously canceled.

Claims 1, 3, 4, and 6-8 are rejected under 35 U.S.C. § 103(a).

(B) RESPONSE TO REJECTION OF CLAIMS 1, 3, 4, & 6-8 UNDER 35 U.S.C. § 103(A) OVER EMCH (U.S. PAT. PUB. NO. US 2002/0071918 A1) IN VIEW OF REKOWSKI, ET AL., (U.S. PAT. PUB. NO. 2003/0031804 A1), CRANE ET AL (U.S. PAT. NO. 6,677,260) AND ANZAI, ET AL (U.S. PAT. NO. 4,837,478)

Claims 1, 3, 4, & 6-8 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. Pub. 2002/0071918 to Emch (*hereinafter*, "Emch"); in view of U.S. Pat. Pub. 2003/0031804 to Rekowski, *et al.* (*hereinafter*, "Rekowski"); U.S. Pat. 6,677,260 to Crane, *et al.* (*hereinafter*, "Crane"); and U.S. Pat. 4,837,478 to Anzai, *et al.* (*hereinafter*, "Anzai").

In the Office Action, the Examiner stated that Emch discloses powder coating a substrate followed by treatment with 700-7000 nm-wavelength, near infrared (NIR) radiation. However, the Examiner recognized that Emch does not teach using a filter coated with borosilicate glass, silica glass, or vitreous ceramics, such that the NIR wavelength range can be restricted to 250-3000 nm with a further restriction, primarily in the range of 750-1200 nm which is a very important aspect of Applicants' invention.

Rekowski was stated to disclose powder coating of substrates (e.g., a car), and a NIR radiation curing. The wavelength range for the NIR radiation is 760-1500 nm. Coatings cured in this range demonstrate rapid cure, sufficient hardness, and good surface quality. However as recognized by the Examiner, Rekowski does not teach or suggest the use of filters to obtain the wavelength range used in Applicants' process.

Crane was cited but simply discloses a silica glass capable of absorbing UV radiation and filtering in the visible region that can be used for tungsten-halogen lamps and other high temperature light sources. The glass has a transmission

greater than 90% in the NIR region of 760-2500 nm. There is no mention of powder coatings or the curing of powder coatings with NIR nor is the wave length range set forth as required by Applicants' claims.

Anzai was cited but only discloses a device radiating NIR light. The device comprises a filter that absorbs visible light, but transmits NIR light. The filter is glass-coated with an absorbing agent such as molybdenum oxide or chromium oxide. The absorbing agents transmit zero in the visible light region and greater than 80% in the 750-1000 nm wavelength. Again no mention of powder coatings or the curing of powder coatings with NIR in the range set forth in Applicants' claims.

The basis for the Examiner's rejection was it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Emch and Rekowski to include the filter of Crane and Anzai. One would have been motivated to do so because Emch in view of Rekowski discloses the use of wavelength in the range of 760-1500 nm but does not disclose how to restrict the wavelengths. Crane teaches a silica glass that is capable of transmitting the NIR region when used with a halogen lamp (NIR emitter) and Anzai teaches a coating that can be applied to a glass that will shorten the wavelength range to 750-1000 nm and therefore, one would have a reasonable expectation of success in using glass coated with an absorbing agent in order to transmit wavelengths in the range of 760-1500 nm. It is Applicants' contention that unless one would have had the benefit of first reading Applicants specification, one skilled in the art would not have been motivated to combine the teachings of these references as set forth in the rejection which is an obvious hindsight reconstruction of Applicants' invention.

In the Examiner's response to Applicants' arguments in the office action (page 2), the Examiner stated that Crane teaches that UV can be detrimental to paints and plastics and that is it would be obvious to use the teachings of Emch and Rekowski to restrict wavelengths to prevent degradation and discoloration of the coating. This is totally incorrect. UV radiation has been and is used to cure coatings but the problem with UV curing is that UV radiation is blocked by any pigments or particles in the coating and complete curing of the coating can not be obtained and that is why it is disadvantages NOT that UV curing degrades and discolors the coating. This has

been clearly pointed out in the specification on page 1, line 22, - page 2, lines 2. The advantage of NIR curing is that the entire coating layer can be heated and cured uniformly and the entire coating layer is cured not just the surface layer as typically occurs with UV curing. Obviously, what Crane refers to is that coatings and plastics once cured can be adversely affected by UV light which is hardly a revelation to anyone including those skilled in the art.

Applicants disagree with the Examiner's interpretation and combination of the references above.

Section 2142 of the MPEP indicates that a *prima facie* case of obviousness is established only when the following three conditions are collectively met:

- (1) all of the claim limitations are either taught, or suggested by the cited prior art;
- (2) there is some suggestion or motivation to modify or combine the cited prior art references; **AND**
- (3) there is a reasonable expectation of successfully producing the claimed invention via such a combination.

The Examiner has not met the burden of proving *prima facie* obviousness because none of the three required conditions (*supra*) are met.

Emch does not teach the use of a filter coated with borosilicate glass, silica glass, or vitreous ceramic to restrict the range of the NIR wavelength to 250-3000 nm with a further restricted wavelength primarily in 750-1200 nm range as recognized by the Examiner. But even more importantly, Emch does not recognize the problem that Applicants have solved. Applicants, by their process, have formed high-quality coatings that preclude air-entrapment in the powder coating. The preclusion improves gloss, appearance, impact and flex of the resultant coating.

Emch, on the other hand, teaches application of powder coatings followed by curing with high-energy radiation but does not restrict the radiation to the primary NIR range of 750-1200 nm by the use of filters, nor does Emch recognize the problems that occur when curing without restricting the primary NIR range to 750-1200 nm.

In the Examples on pages 6-8, and in Figures 1 and 2 in the Specification, Applicants show a comparison between a powder coating cured without the NIR filter and the same powder coating cured with the NIR filter.

According to the Table on Page 7, when the NIR filter is used, air is not entrapped, and there is improvement in gloss, flow, impact resistance, and flexural strength of coatings. On the other hand, when the NIR filter is not used, air is entrapped (see Figure 1), and there is no improvement in gloss, flow, impact resistance, and flexural resistance of the coatings.

Essentially, the Emch process is equivalent to curing without an NIR filter. The appearance of powder coatings cured with and without the use of an NIR filter is illustrated in Figures 1 and 2 of the present Specification. Figure 1 shows the coating cured without a NIR filter (Emch) while Figure 2 shows the coating cured with an NIR filter (invention). The appearance of Figure 2 (the invention) is significantly better than Figure 1 (representative of the prior art, Emch).

In regards to Rekowski, the Examiner recognizes that Rekowski does not teach or suggest the use of filters to achieve the wavelength range that Applicants achieve in their process by the use of appropriate filters. In fact, Rekowski simply uses conventional radiation emitters to cure the powder coating compositions to ensure that an NIR radiation is used. Rekowski does not use filters at all. In particular, see Rekowski, Example 2, Paragraph [0091] wherein a commercial radiation emitter, High-Burn radiation emitter from Adphos, is used. In the previous amendment a document was attached that discussed the curing of powder lacquers (from IndustrieSerVis Company, now Adphos). This document is hereby incorporated into this amendment. Figure 2 in that document shows the radiation distribution (Planck) of an emitter in the IR range. The emitter covers a wavelength spectrum in the range of about 250 to 6000 nm. Applicants submit that, when using such high-energy emitters, which include a broad band of radiation, including NIR, but without the use of a filter, the results would be the same as in Applicants' comparative Example discussed above, i.e., poor appearance of the resultant cured coating.

Further, Rekowski determines only the hardness of the cured coating in Example 2, Paragraph [0096]. Rekowski does not address the issue of the appearance of the resulting coating. Figures 1 and 2 of Applicants' Specification clearly show the difference between the grainy appearance of a coating cured with a broad wave length emitter (Figure 1) compared to the smooth and even appearance of a coating cured with an emitter having a filter with a primary NIR range of 750-1200 nm (Figure 2). Rekowski's teachings have been recognized by Applicants on Page 1, starting at Line 22 of the Specification. Applicants recognized Rekowski as providing inferior coatings. Clearly, combining Rekowski with Emch will not improve the result either.

One advantage of Applicants' process is that it can be used with conventional IR radiation emitters, the automotive and truck manufacturing industry is not forced to replace old equipment for new equipment. An appropriate filter would suffice to provide the advantages of Applicants' process, as set forth in Claim 1, to allow for the exposure of a powder coating to NIR radiation in the 750-1200 nm wavelength range. This certainly is not taught or suggested by either Emch or Rekowski.

In regard to Crane and Anzai, a person skilled in the art would not be motivated to combine these two references with the Emch and/or Rekowski processes because Crane and Anzai use filters for completely different applications.

Crane discloses glasses having a high transmission through a visible region and the NIR region. These glasses can absorb UV radiation and can filter out the yellow light in the visible spectrum region. They are suitable as lamp envelopes; particularly in low-cost lamp systems that are meant to provide alternatives to high-intensity discharge (HID) lamps in a high performance vehicle lighting system. (See Crane, col. 3, line 66 – col. 4, line 9.) These glasses can also be used for other applications where high contrast and "enhanced visible properties" of transmitted or reflected visible light can be a benefit, e.g., ophthalmic uses such as sunglasses, glass hosts for lasers, computer screens, and rear view mirrors with reduced glare. (See col. 3, lines 47-54.) Therefore, clearly the Crane glasses are used for applications completely different from that of the present application. As noted

previously, the invention relates to applying and curing a powder coating using NIR radiation.

Also, Crane does not supplement the deficiencies of Emch and Rekowski, discussed previously, as Crane relates to a entirely different use. In fact, doing so would amount to hindsight reconstruction which is not permitted according to MPEP § 2144.

Since Crane is directed to a completely different field of endeavor, i.e., Crane relates to optics. And Emch-Rekowski relate to painting and curing coats on solids, the teaching of Crane cannot be logically combined with the Emch-Rekowski process simply on the basis that they use NIR light. But, Applicants emphasize that their invention is not the NIR light. Both the invention and the references use NIR light. The similarity ends there.

Additionally, Crane does not describe or use coated glasses in its application. Coated glasses or ceramics, on the other hand, are described and necessary for the present invention. Coated filters are expressly mentioned, for example, in Claim 1 of the invention. That the filters of the invention can be coated on one or both sides (Claim 6, for example) is also not disclosed in Crane.

Anzai does not supplement the deficiencies of Emch, Rekowski and Crane combined to arrive at the invention of Claim 1. Anzai relates to a entirely different use. In fact, combining Emch, Rekowski, Crane and Anzai would amount to hindsight reconstruction, which is not permitted.

The purposes of Emch-Rekowski, Crane, and Anzai are all different. Anzai, in particular, describes an NIR illuminator and image pick-up device comprising a filter which removes the visible region and permits the NIR region, e.g., in the 750-1000 nm wavelength range. This range of light is not perceived by humans. Thus, it can be used as a crime-prevention and monitoring device because the light range is not visible in the dark. (See Anzai, col. 2, lines 37-50.) Clearly, this application is not even remotely related to the present invention of curing paints and coatings.

Additionally, the Anzai filter glass is prepared by mixing in the lead glass, an absorbing agent such as MnO_2 or Cr_2O_3 , or by varying the absorbing agent to be mixed into the filter glass. (See col. 3, lines 25-26 and lines 58-61.) In contrast, in the present invention, the filters are coated, either on one side or both sides. Therefore, the first condition of the *prima facie* obviousness test is not met. None of the references disclose a coated filter, which is essential to the present invention.

Therefore, the second condition of the *prima facie* obviousness test is not satisfied as the references are not combinable, either for a lack of suggestion of such combination or for the lack of motivation of such combination.

Anzai, Crane, Emch-Rekowski, and the Applicants' invention, all use NIR wavelengths (and some even in a similar range). Applicants' invention is not the NIR wavelength range. Anzai technology relates to crime prevention and Crane relates to optics, but the present invention relates to curing of paints on three-dimensional substrates, cars, for example.

There is no motivation to combine the references (clearly, there is no suggestion to combine), because according to the MPEP, "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggest the desirability of the combination." (MPEP 2143.01 Part III) Nor would such a person have a reasonable expectation of successfully arriving at the invention of Claim 1 (particularly in light of the Anzai difference in addition of absorbing agent). Thus, the third condition of the *prima facie* obviousness test is also not satisfied.

Because Claims 3, 4, and 6-8 are dependent directly or indirectly on Claim 1, said claims are also not obvious over the combined references.

In light of the above arguments, as none of the three conditions are satisfied, Applicants submit that the Examiner has not met the burden of establishing a *prima facie* case of obviousness under 35 U.S.C. § 103(a). Applicants respectfully request that the Examiner withdraw rejections of Claims 1, 3, 4, and 6-8 and the claims be allowed.

CONCLUSION


In view of the above remarks, Applicants respectfully submit that the stated grounds of rejection have been properly traversed, accommodated, or rendered moot and that a complete response has been made to the Final Office Action mailed on May 16, 2007. Therefore, Applicants believe that the application stands in condition for allowance with withdrawal of all grounds of rejection. A Notice of Allowance is respectfully solicited.

If the Examiner has questions regarding the application or the contents of this response, the Examiner is invited to contact the undersigned at the number provided.

Should there be a fee due which is not accounted for, please charge such fee to Deposit Account No. 04-1928 (E. I. du Pont de Nemours & Co.).

Respectfully submitted,

DATE: JULY 12, 2007


Hilmar L. Fricke
Reg. No. 22,384
Attorney for Applicants
Telephone No.: (302) 984-6058
Facsimile: (302) 658-1192